315* Cardiac autonomic neuropathy (CAN) is more likely to occur in cystic fibrosis (CF) patients with or without diabetes than in patients with type 1 diabetes (T1DM)

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Background: We have previously demonstrated that there is a high prevalence of CAN in CF patients with and without CF related diabetes (CFRD). In order to determine whether CF augments the toxic effect of glucose on the autonomic nervous system, we have compared CF patients with non-CF patients with Type 1 diabetes (T1DM).
Aim: To compare the prevalence and severity of CAN in CFRD, CF without diabetes and T1DM.
Methods: A prospective study was carried out at Heartlands Hospital where CF patients with and without CFRD and T1DM patients were recruited. CAN was assessed using heart rate variability and spectral analysis during timed deep breathing, Valsalva manoeuvre, standing and postural blood pressure change using ANSAR 3.0 (The Ansar group inc, Pennsylvania) CAN was diagnosed when 2 or more standardised tests were abnormal. The severity of CAN was assessed by spectral analysis.
Results: See the table.

	CF without DM	CFRD	T1DM	p value (CFRD versus T1DM)
Male gender, %	33	31	60	
Age	22	28	35	<0.001
HbA1c	5.75	7.13	7.99	<0.001
Prevalence of CAN, %	22	38	11	0.046

Summary and Conclusions: The prevalence of CAN is higher in CFRD patients with compared with patients with T1DM, despite the fact that the T1DM group were older and had higher HbA1c. Severity of CAN was significantly higher in CFRD compared with T1DM in various sympathetic and parasympathetic parameters (p values ranging from 0.006–0.000). We conclude that CF increases the toxic effect of glucose on the autonomic nervous system. Although the mechanism of this effect is unclear, chronic inflammatory mechanisms are likely to contribute to this finding.

316* Cardiac autonomic neuropathy (CAN) is related to lung function in adults with cystic fibrosis related diabetes (CFRD)

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Background: CAN is a well recognised complication of diabetes mellitus and is associated with higher levels of systemic inflammation and increased cardiovascular risk. We have previously demonstrated a high prevalence of CAN in patients with and without CFRD. The aim of this study was to assess the relationship between lung function and CAN in CFRD.
Methods: We performed a prospective cross sectional study of adults with CF adults. Demographic data including, biochemistry, spirometry, presence of CF liver and pancreatic disease and HbA1c were recorded. CAN was assessed using heart rate variability and spectral analysis during baseline, deep breathing, valsalva manoeuvre, standing position and postural blood pressure change using ANSAR 3.0 (Ansar group Inc., Pennsylvania). A diagnosis of CAN was made on the basis of 2 abnormal standardised tests.
Results: 29 subjects with CFRD were recruited (31% male, mean age 27). The prevalence of CAN was 38% in CFRD patients. There was a trend towards lower FEV1 in CAN+ compared with CAN– patients [median (IQR) 1.4 L (1.1–1.7) vs 1.7 L (1.3–2.2), $p = 0.26$]. FVC was lower in CAN+ compared with CAN– patients: 2.4 L (1.6–2.7) vs 3.0 L (2.2–3.5), $p = 0.11$. There were several positive (statistically significant) correlations between spectral analysis indices, FEV1 and FVC. No association between pancreatic status, presence of liver disease, vitamin D or E levels or HbA1c between patients with and without CAN was found.
Conclusion: Severity of lung function impairment was positively associated with the presence of CAN. We hypothesise that this finding could be due to increasing levels of systemic inflammation as CF lung disease progresses.

317 Service provision for cystic fibrosis related diabetes (CFRD) in UK CF centres

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Introduction: CFRD is associated with clinical deterioration and significant complications, and is increasingly common as patients live longer. Because management is different from traditional diabetes, specialist care is needed to achieve optimum outcomes. We were interested in how different CF clinics in the UK managed CFRD care.
Method: Using a structured questionnaire we surveyed 15 CF centres in the UK (total 1513 patients) asking the proportion with CFRD, who led CFRD care, frequency of reviews, treatments used, annual screen content and satisfaction with service.
Results: There were 6 adult (1047 patients, 327 (31%) with CFRD), 7 paediatric (381 patients, 9 (1%) with CFRD) and 2 mixed (85 patients, 11 (13%) with CFRD) centres. Care was led by diabetes nurse specialists in 6 centres, shared between disciplines in 8, and led by a CF nurse specialist (CFNS) in 1. Annual CFRD screens were performed in all centres and were based on all elements of NICE diabetes guidelines in 8, partially in 4, and less in the remainder. Treatment of complications were shared between disciplines in every centre. All used insulin therapy, 9 used oral glycaemic agents at times and 3 insulin pumps. CFNS instigated insulin in 2 centres, in a further 3 in conjunction with medical staff, but in the remainder it was done by CF clinicians or endocrinologists. 13 centres (87%) were satisfied with the provision of their service.
Conclusion: There is a wide variation of care provided for CFRD. In some centres CFNS were pivotal, in others care was outsourced to other specialities. More insight is needed into the most appropriate way of delivering care for these complex patients.

318 The impact of appointing a diabetes specialist nurse with an interest in cystic fibrosis on patient outcomes

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Background: The prevalence of cystic fibrosis (CF)-related diabetes mellitus (CFRD) is increasing, reflecting the improvements in management of CF itself. As a result, a diabetes specialist nurse with an interest in CFRD (CFDSN) was appointed to our CF multidisciplinary team in February 2008. The aim of this study was to assess the impact that this has made to the control of diabetes in patients with CFRD at our regional adult CF centre.
Methods: We conducted a retrospective cohort study including all patients with CFRD attending our centre between 2006 and 2010. We obtained lung function and BMI for all patients. We compared HbA1C in 2006 to the HbA1C in 2010. We also analysed the results of a patient satisfaction questionnaire completed by 20 patients in 2010.
Results: Table 1 compares data from 2006 (prior to the CFDSN) and 2010 (2 years after our CFDSN was appointed). Median HbA1C significantly improved from 2006 to 2010 ($p < 0.02$). All 20 patients felt that their knowledge of CFRD improved following contact with our CFDSN. Prior to her appointment, 8/20 patients felt that they did not have easy access to a Diabetes Specialist Nurse.
Discussion: This study shows that the glycaemic control of our cohort of patients with CFRD has improved since the appointment of a CFDSN. Patients in particular report an improved access to specialist diabetes advice which has helped to improve their knowledge. The observed improvements in outcomes may be confounded by other factors, but we feel that a CFDSN can play a vital role in the management of patients with CFRD.

Table 1

Year	CF patients		BMI		HbA1C		On insulin
	Total	CFRD patients	Median	IQR	Median	IQR	
2006	328	90 (27.4%)	22.7	20.9–24.7	7.2%	6.2–8.4%	86 (95.6%)
2010	339	142 (41.9%)	22.7	20.7–24.4	6.7%	6–7.5%	138 (97.2%)